1.05 Circulatory disease

Prevalence, incidence and number of hospital separations with a principal diagnosis of circulatory disease for Aboriginal and Torres Strait Islander peoples expressed as a rate by age group, age-standardised rate and rate ratio

Data sources

Data for this measure come from the National Aboriginal and Torres Strait Islander Health Survey, the Bettering the Evaluation and Care of Health survey and the AIHW National Hospital Morbidity Database.

National Aboriginal and Torres Strait Islander Health Survey (NATSIHS)

The 2004–05 NATSIHS collected information from 10,439 Indigenous Australians of all ages. This sample was considerably larger than the supplementary Indigenous samples in the 1995 and 2001 National Health Surveys. The survey was conducted in remote and non-remote areas of Australia and collected a range of information from Indigenous Australians about health-related issues including health-related actions, health risk factors, health status, socioeconomic circumstances and women's health. It is planned to repeat the NATSIHS at 6-yearly intervals, with the next NATSIHS to be conducted in 2010–11. Selected non-Indigenous comparisons are available through the 2004–05 National Health Survey (NHS).

Bettering the Evaluation and Care of Health (BEACH) survey

Information about encounters in general practice is available from the BEACH survey, which is conducted by the AIHW Australian GP Statistics and Classification Centre. Information is collected from a random sample of approximately 1,000 general practitioners (GPs) from across Australia each year. A sample of 100 consecutive encounters is collected from each GP.

The number of Indigenous patients identified in the BEACH survey is likely to be underestimated. This is because some GPs might not ask about Indigenous status, or the patient may choose not to identify (AIHW 2002). The estimates presented here are also derived from a relatively small sample of GP encounters involving Indigenous Australians.

Because of a late inclusion of a 'not stated' category of Indigenous status in 2001–02 (before which 'not stated' responses were included with non-Indigenous encounters), GP encounters for which Indigenous status was not reported have been included with encounters for non-Indigenous people under the 'other' category.

Data are presented for the 5-year period 2002–03 to 2006–07, during which there were 7,542 GP encounters with Aboriginal and Torres Strait Islander patients recorded in the survey, representing 1.5% of total GP encounters in the survey.

Hospitalisations

The National Hospital Morbidity Database is a compilation of episode-level records from admitted patient morbidity data collection systems in Australian hospitals in each state and territory. Information on the characteristics, diagnoses and care of admitted patients in public and private hospitals is provided annually to the AIHW by state and territory health departments.

Data are presented for the six jurisdictions which have been assessed by the AIHW as having adequate identification of Indigenous hospitalisations in 2004–05—New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory. These six jurisdictions represent approximately 96% of the Indigenous population of Australia. Data are presented by state/territory of usual residence of the patient.

Hospitalisations for which the Indigenous status of the patient was not reported have been included with hospitalisations data for non-Indigenous people under the 'other' category. This is to enable consistency across jurisdictions, as public hospitals in some states and territories do not have a category for the reporting of 'not stated' or inadequately recorded/reported Indigenous status.

Hospitalisation data are presented for the 2-year period July 2004 to June 2006. An aggregate of 2 years of data has been used, as the number of hospitalisations for some conditions is likely to be small for a single year.

The principal diagnosis is the diagnosis established to be the problem that was chiefly responsible for the patient's episode of care in hospital. The additional diagnosis is a condition or complaint either coexisting with the principal diagnosis or arising during the episode of care. The term 'hospitalisation' has been used to refer to a separation which is the episode of admitted patient care, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending a change in a type of care (for example, from acute to rehabilitation). 'Separation' also means the process by which an admitted patient completes an episode of care by being discharged, dying, transferring to another hospital or changing type of care.

Analyses

Age-standardised rates and ratios have been used as a measure of morbidity in the Indigenous population relative to other Australians. Ratios of this type illustrate differences between the rates of morbidity among Indigenous people and those of other Australians, taking into account differences in age distributions.

Self-reported prevalence

Self-reported data from the National Aboriginal and Torres Strait Islander Health Survey on the prevalence of heart and circulatory conditions among Aboriginal and Torres Strait Islander people are presented in the tables in this section and figure 1.05.1.

Prevalence by age and sex

- In 2004–05 approximately 23% of Indigenous Australians reported having a heart or circulatory condition compared with 20% of non-Indigenous Australians.
- High blood pressure was the most common type of heart and circulatory condition reported by Indigenous and non-Indigenous Australians (15% and 11% respectively) (Table 1.05.1), followed by high cholesterol (7% for both population groups).
- Heart and circulatory conditions were most prevalent among those aged 55 years and over (57% for Indigenous Australians and 53% for non-Indigenous Australians).
- A higher proportion of Indigenous Australians reported having a heart or circulatory problem than non-Indigenous Australians across all age groups 25 years and over (Figure 1.05.1).

Table 1.05.1: Persons reporting heart and circulatory conditions, by Indigenous status and age group, 2004–05[(a)]

	0–24 years		25–44 years		45–54 years		55 years and over		Total[(b)]	
	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.
					Per cent					
Total with heart or circulatory condition	**2**	**2**	**17**	**12**	**35**	**28**	**57**	**53**	**23***	**20***
Has current and/or long-term high blood pressure	—[(c)]	—[(c)]	8*	4*	23*	14*	43*	34*	15*	11*
Heart murmur/heart valve disorder	1	1	3*	1*	2[(c)]	2	4	3	2*	2*
Total persons	**272,736**	**6,396,209**	**128,829**	**5,660,920**	**39,578**	**2,705,580**	**33,167**	**4,529,678**	**474,310**	**19,292,387**

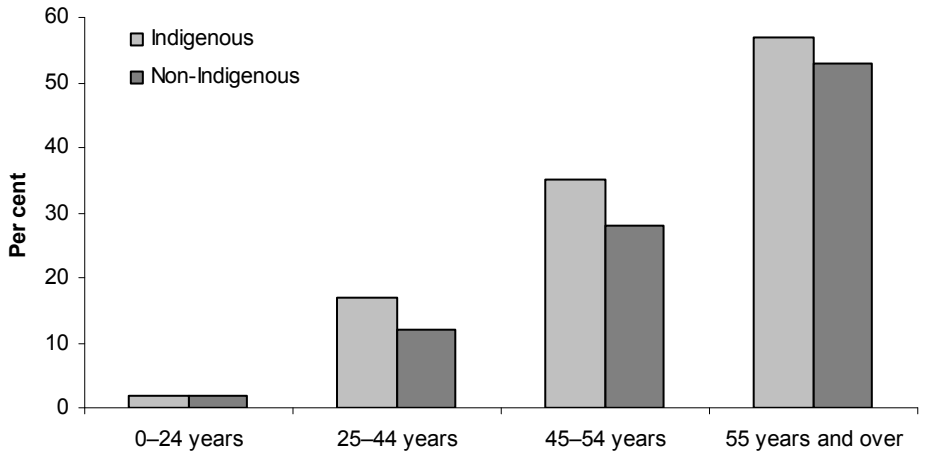
* Represents results with statistically significant differences in the Indigenous/non-Indigenous comparisons.

(a) Self-reported data from the National Aboriginal and Torres Strait Islander Health Survey 2004–05.

(b) Age-standardised proportions.

(c) Estimate has a relative standard error of 25% to 50% and should be used with caution.

Source: ABS and AIHW analysis of 2004–05 National Aboriginal and Torres Strait Islander Health Survey and 2004–05 National Health Survey.



Source: AIHW analysis of 2004–05 National Aboriginal and Torres Strait Islander Health Survey.

Figure 1.05.1: Proportion of persons reporting heart and circulatory conditions, by Idnigenous status and age group, 2004–05

Prevalence by remoteness and time series

- In 2004–05, the prevalence of heart/circulatory conditions was slightly higher among Aboriginal and Torres Strait Islander males and females in remote areas (12% and 17% respectively) than those in non-remote areas (10% and 14% respectively) (Table 1.05.2).
- There has been little change in the prevalence of heart/circulatory conditions among Aboriginal and Torres Strait Islander peoples between 2001 and 2004–05.

Table 1.05.2: Indigenous persons reporting heart and circulatory problems/diseases,[(a)] by sex and remoteness area, 1995, 2001 and 2004–05

	1995[(b)]			2001			2004–05		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
					Per cent				
Remote	n.a.	n.a.	n.a.	10	16	12	12	17	14
Non-remote	15	16	15	10	13	10	10	14	11
Total	**n.a.**	**n.a.**	**n.a.**	**10**	**14**	**11**	**11**	**15**	**12**
Total number	**131,616**	**133,800**	**265,416**	**217,893**	**225,102**	**442,995**	**232,362**	**241,948**	**474,310**

(a) ICD-10-AM based output classification.

(b) Non-remote data are not available from the 1995 National Health Survey.

Sources: ABS and AIHW analysis of 1995 National Health Survey (Indigenous supplement); 2001 National Health Survey (Indigenous supplement); 2004–05 National Aboriginal and Torres Strait Islander Health Survey.

Prevalence by selected population and health characteristics

- In 2004–05, Indigenous Australians aged 15 years and over were more likely to report having heart or circulatory problems if they were in the lowest (1st) quintile of household income than in the highest (5th) income quintile (28% compared with 25%); if the highest year of school completed was Year 9 or below than if Year 12 was the highest

year of school completed (30% compared with 24%); and if they were unemployed or not in the labour force (28% and 30%) than if they were employed (23%).

- Indigenous Australians with reported fair/poor health status were much more likely to report heart or circulatory problems than Indigenous Australians with excellent/very good health status (37% compared with 19%). The proportions for non-Indigenous Australians were similar (34% compared with 16%).
- Indigenous Australians aged 18 years and over were more likely to report heart or circulatory problems if they reported their exercise level as low or sedentary rather than high (28% compared with 11%). They were also more likely to report heart or circulatory problems if they had experienced stressors in the previous 12 months (21%) than if no stressors were experienced (17%); if they drank at risky/high-risk levels in the last 12 months than if they did not (31% compared with 28%); and if they were overweight and obese than if they were normal or underweight (29% compared with 21%).
- Indigenous Australians aged 15 years and over were much more likely to report having heart or circulatory problems if they also reported hypertension, diabetes or high cholesterol than if they did not report these conditions. This was also the case for non-Indigenous Australians.

Table 1.05.3: Proportion[(a)] of Indigenous and non-Indigenous Australians aged 15 years and over with heart/circulatory problems, by selected population characteristics, 2004–05

	Indigenous Australians		Non-Indigenous Australians	
	Has heart/circulatory problems	Does not have heart/circulatory problems	Has heart/circulatory problems	Does not have heart/circulatory problems
Household income				
1st quintile	28.2	71.8	25.7	74.3
5th quintile	24.8	75.2	16.7	83.3
Financial stress—able to raise $2,000 within a week for something important				
Yes	15.9	84.1	n.a.	n.a.
No	20.0	80.0	n.a.	n.a.
Highest year of school completed				
Year 12	23.6	76.4	18.4	81.6
Year 9 or below	30.0	70.0	24.6	75.4
Whether has non-school qualification				
Has a non-school qualification	25.4	74.6	20.7	79.3
Does not have a non-school qualification	28.0	72.0	21.9	78.1
Employment				
Employed	22.5	77.5	17.0	83.0
Unemployed	28.2	71.8	13.6	86.4
Not in the labour force	30.3	69.7	25.9	74.1
Housing				
Owner	17.3	82.7	n.a.	n.a.
Renter	18.4	81.6	n.a.	n.a.
Stressors in last 12 months[(b)]				
Serious illness or disability	24.5	75.5	n.a.	n.a.
Total experienced stressors	21.4	78.6	n.a.	n.a.
No stressors	16.8	83.2	n.a.	n.a.
Self-assessed health status				
Excellent/very good	18.8	81.2	15.9	84.1
Good	24.1	75.9	23.2	76.8
Fair/poor	37.4	62.6	33.5	66.5
Smoker status[(b)]				
Current daily smoker	29.0	71.0	19.4	80.6
Not current daily smoker	27.7	72.3	22.9	77.1
Risky/high-risk alcohol consumption in last 12 months[(b)]				
Yes	31.0	69.0	20.5	79.5
No	28.1	71.9	22.8	77.2

(continued)

Table 1.05.3 (continued): Proportion[(a)] of Indigenous and non-Indigenous Australians aged 15 years and over with heart/circulatory problems, by selected population characteristics, 2004–05

	Indigenous Australians		Non-Indigenous Australians	
	Has heart/circulatory problems	Does not have heart/circulatory problems	Has heart/circulatory problems	Does not have heart/circulatory problems
Whether used substances in last 12 months[(b)(c)]				
Yes	13.0	87.0	n.a.	n.a.
No	21.3	78.7	n.a.	n.a.
Physical activity[(c)]				
Low/sedentary	27.5	72.5	21.9	78.1
Moderate	21.9	78.1	21.0	79.0
High	11.0	89.0	15.4	84.6
Overweight/obesity				
Yes	29.3	70.7	23.8	76.2
No	20.6	79.4	18.5	81.5
Eats vegetables daily				
Yes	27.0	73.0	21.4	78.6
No	24.5	75.5	27.0	73.0
Eats fruit daily				
Yes	27.1	72.9	21.5	78.5
No	24.9	75.1	19.6	80.4
Hypertension				
Yes	97.4	2.6	94.4	5.6
No	11.6	88.4	10.9	89.1
Diabetes				
Yes	39.5	60.5	35.6	64.4
No	23.9	76.1	20.4	79.6
High cholesterol				
Yes	59.6	40.4	44.5	55.5
No	23.4	76.6	18.6	81.4
Total (age-standardised)	**26.9**	**73.1**	**21.4**	**78.6**
Total (crude)	**18.1**	**81.9**	. .	. .
Total number persons aged 15 years and over	53,179	240,462	3,422,780	12,109,597

(a) Proportions are age-standardised except for data for financial stress, housing tenure, substance use in the last 12 months and stressors experienced in the last 12 months for which crude proportions are presented, as data for non-Indigenous Australians are not available.

(b) Persons aged 18 years and over.

(c) Non-remote areas only.

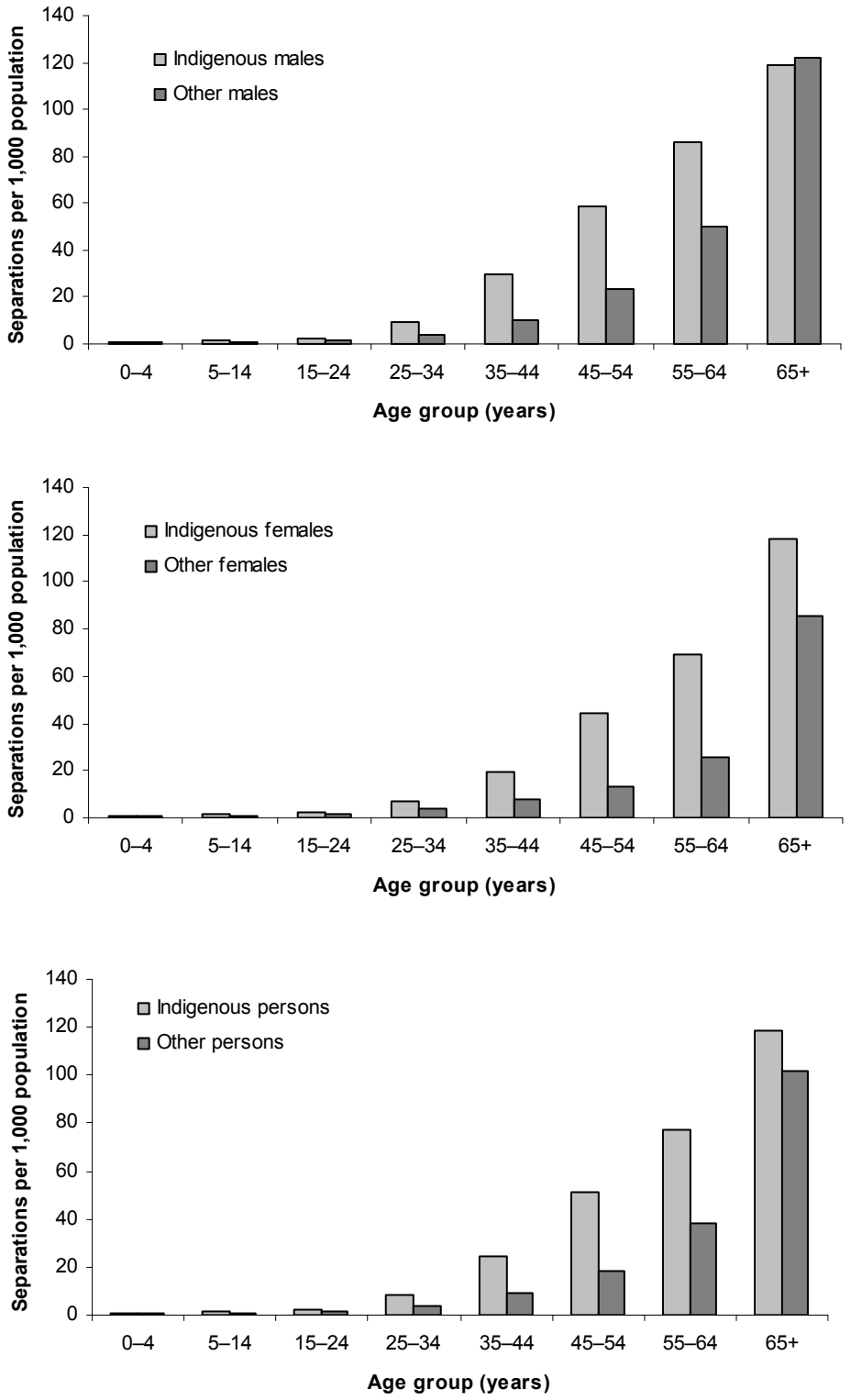
Source: AIHW analysis of 2004–05 National Aboriginal and Torres Strait Islander Health Survey.

Hospitalisations

- For the 2-year period July 2004 to June 2006, there were 872,421 hospitalisations for circulatory diseases in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, 15,314 (1.8%) of which were hospitalisations of Aboriginal and Torres Strait Islander peoples.
- Circulatory disease is the eighth most common diagnosis at the ICD-10-AM chapter level for Aboriginal and Torres Strait Islander Australians admitted to hospital. Approximately 3% of all hospitalisations of Indigenous Australians were for circulatory diseases.

Hospitalisations by age and sex

- For the 2-year period July 2004 to June 2006, in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, Indigenous females had higher hospitalisation rates for circulatory diseases than other females across all age groups. Indigenous males had higher hospitalisation rates for circulatory diseases than other males across all age groups except for those aged 65 years and over (Figure 1.05.2).
- The greatest difference in hospitalisation rates for males occurred in the 5–14, 35–44 and 45–54 year age groups where Indigenous males were hospitalised at between two and three times the rate of other Australian males. The greatest difference in hospitalisation rates for females occurred in the 35–44 , 45–54 and 55–64 year age groups where Indigenous females were hospitalised at around three times the rate of other Australian females.
- Hospitalisation rates for circulatory diseases increased with age for both Indigenous and other Australians.
- Approximately 53% of Indigenous Australians hospitalised for circulatory diseases were males (8,041) and 47% were females (7,273).



Source: AIHW analysis of National Hospital Morbidity Database.

Figure 1.05.2: Age-specific hospitalisation rates for a principal diagnosis of circulatory disease, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006

Hospitalisations by state/territory

Table 1.05.4 presents hospitalisations for a principal diagnosis of diseases of the circulatory system for the 2-year period July 2004 to June 2006 for New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory. As well as rates and ratios for the six jurisdictions which have been assessed as having adequate identification of Indigenous hospitalisations in 2004–05, unadjusted and adjusted national level data are also included in the table. The Australia data are adjusted by applying a completeness factor of 89.4%, which is an estimate of the level of Indigenous under-identification in hospital separations data.

- Over the period July 2004 to June 2006, Indigenous Australians in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined were hospitalised for circulatory disease at almost twice the rate of other Australians.
- When hospital rates are adjusted at the national level for Indigenous under-identification, Indigenous persons were hospitalised for circulatory disease at 1.8 times the rate of other Australians.
- In New South Wales, Queensland, Western Australia, South Australia and the Northern Territory, Indigenous persons were hospitalised for circulatory diseases at around twice the rate of other Australians. In Victoria, Indigenous persons were hospitalised for circulatory diseases at around 0.9 times the rate of other Australians.

Table 1.05.4: Hospitalisations for principal diagnosis of diseases of the circulatory system, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006[(a)(b)(c)(d)]

	Indigenous				Other[(e)]				
	Number	No. per 1,000[(f)]	LCL 95%[(g)]	UCL 95%[(h)]	Number	No. per 1,000[(f)]	LCL 95%[(g)]	UCL 95%[(h)]	Ratio[(i)]
NSW									
Males	2,062	34.6	32.6	36.7	174,868	26.6	26.4	26.7	1.3*
Females	1,746	28.5	26.9	30.2	128,086	16.5	16.4	16.6	1.7*
Persons[(j)]	3,808	31.5	30.2	32.7	302,971	21.2	21.2	21.3	1.5*
Vic									
Males	313	22.9	19.5	26.3	132,941	27.3	27.1	27.4	0.8*
Females	234	15.9	13.5	18.4	103,171	17.7	17.6	17.9	0.9
Persons[(j)]	547	18.9	17.0	20.9	236,112	22.2	22.1	22.3	0.9*
Qld									
Males	2,318	42.9	40.7	45.2	96,712	26.0	25.8	26.2	1.7*
Females	2,299	40.1	38.1	42.1	70,960	17.1	17.0	17.2	2.3*
Persons[(j)]	4,617	41.5	40.0	43.0	167,672	21.4	21.3	21.5	1.9*
WA									
Males	1,383	40.5	38.0	43.1	43,291	23.6	23.4	23.8	1.7*
Females	1,337	36.4	34.2	38.6	30,238	14.7	14.6	14.9	2.5*
Persons[(j)]	2,720	38.4	36.7	40.0	73,529	19.0	18.8	19.1	2.0*
SA									
Males	670	48.3	44.0	52.6	41,185	25.3	25.0	25.5	1.9*
Females	468	33.7	30.2	37.2	32,500	16.5	16.3	16.6	2.0*
Persons[(j)]	1,138	40.6	37.9	43.4	73,685	20.6	20.4	20.7	2.0*
NT									
Males	1,295	40.3	37.6	43.0	2,133	20.4	19.4	21.5	2.0*
Females	1,189	33.0	30.8	35.2	1,005	13.2	12.2	14.1	2.5*
Persons[(j)]	2,484	36.4	34.7	38.1	3,138	17.3	16.6	18.0	2.1*
NSW, Vic, Qld, WA, SA & NT[(d)]									
Males	**8,041**	**38.3**	**37.2**	**39.4**	**491,130**	**26.2**	**26.1**	**26.3**	**1.5***
Females	**7,273**	**32.8**	**31.9**	**33.7**	**365,960**	**16.8**	**16.7**	**16.8**	**2.0***
Persons[(j)]	**15,314**	**35.4**	**34.7**	**36.1**	**857,107**	**21.2**	**21.2**	**21.3**	**1.7***
Australia unadjusted[(k)]									
Males	8,270	37.7	36.7	38.8	513,122	26.3	26.2	26.4	1.4*
Females	7,414	32.1	31.2	32.9	381,491	16.8	16.7	16.8	1.9*
Persons[(j)]	15,684	34.8	34.1	35.4	894,631	21.3	21.2	21.3	1.6*
Australia adjusted[(k)(l)]									
Males	9,242	42.2	41.1	43.3	512,150	26.2	26.2	26.3	1.6*
Females	8,285	35.8	34.9	36.8	380,620	16.7	16.7	16.8	2.1*
Persons[(j)]	17,527	38.9	38.2	39.6	892,788	21.2	21.2	21.3	1.8*

(continued)

Table 1.05.4 (continued): Hospitalisations for principal diagnosis of diseases of the circulatory system, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006[(a)(b)(c)(d)]

* Represents results with statistically significant differences in the Indigenous/other comparisons at the $p < 0.05$ level.

(a) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.

(b) Categories are based on the ICD-10-AM fifth edition (National Centre for Classification in Health 2006); ICD-10-AM codes I00–I99.

(c) Financial year reporting.

(d) Data are reported by state/territory of usual residence of the patient hospitalised and are for New South Wales, Victoria, Western Australia, South Australia, the Northern Territory and Queensland only. These six jurisdictions are considered to have adequate Indigenous identification, although the level of accuracy varies by jurisdiction and hospital. Hospitalisation data for these six jurisdictions should not be assumed to represent the hospitalisation experience in the other jurisdictions.

(e) 'Other' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

(f) Directly age-standardised using the Australian 2001 standard population.

(g) LCL = lower confidence limit.

(h) UCL = upper confidence limit.

(i) Rate ratio Indigenous:other.

(j) Includes hospitalisations for which sex was indeterminate or not stated.

(k) Includes all eight states and territories, including the Australian Capital Territory and Tasmania; Other Territories and Residence State not applicable (e.g. overseas, at sea, no fixed address).

(l) Australian hospitalisation numbers and rates have been adjusted for Indigenous under-identification using a national adjustment factor of 0.89. This factor was derived from a study undertaken by the AIHW in 2007 which assessed the level of Indigenous under-identification in hospital data in all states and territories by comparing information gathered from face-to face interviews in public hospitals with results from hospital records. By applying this factor, the number of Indigenous hospitalisations was increased by 11% and these additional hospitalisations then subtracted from the number of hospitalisations for Other Australians.

Source: AIHW analysis of National Hospital Morbidity Database.

Hospitalisations by principal diagnosis

Table 1.05.5 presents hospitalisations with a principal diagnosis of diseases of the circulatory system by type of circulatory disease for the 2-year period July 2004 to June 2006 for the six jurisdictions.

- For the 2-year period July 2004 to June 2006 in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, of all hospitalisations with a principal diagnosis of diseases of the circulatory system, ischaemic heart disease was the most common reason for hospitalisation among Aboriginal and Torres Strait Islander peoples (43%), followed by other heart disease (30%).
- Indigenous males and females were hospitalised for rheumatic heart disease at much higher rates than other males and females (five and nine times respectively).
- Indigenous males and females were hospitalised for ischaemic heart disease at two and three times the rate of other males and females respectively.
- Indigenous Australians were hospitalised at around four times the rate of other Australians for hypertension disease.

Table 1.05.5: Hospitalisations of Indigenous persons for principal diagnosis of diseases of the circulatory system, by type of circulatory disease and sex, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006[(a)(b)(c)(d)]

	Males						Females						Persons					
Principal diagnosis	**No.**	**%[(e)]**	**No. per 1,000[(f)]**	**LCL 95%[(g)]**	**UCL 95%[(h)]**	**Ratio[(i)]**	**No.**	**%[(e)]**	**No. per 1,000[(f)]**	**LCL 95%[(g)]**	**UCL 95%[(h)]**	**Ratio[(i)]**	**No.**	**%[(e)]**	**No. per 1,000[(f)]**	**LCL 95%[(g)]**	**UCL 95%[(h)]**	**Ratio[(i)]**
Ischaemic heart disease (I20–I25)	3,778	47.0	17.7	17.0	18.4	1.7*	2,820	38.8	12.8	12.3	13.4	2.7*	6,598	43.1	15.1	14.7	15.6	2.0*
Acute myocardial infarction (I21)	*1,468*	*18.3*	*6.8*	*6.3*	*7.2*	*2.1**	*978*	*13.4*	*4.7*	*4.3*	*5.0*	*3.4**	*2,446*	*16.0*	*5.7*	*5.4*	*5.9*	*2.5**
Pulmonary heart disease and other forms of heart disease (I26–I52)	2,352	29.3	12.2	11.6	12.9	1.7*	2,207	30.3	11.0	10.5	11.6	2.1*	4,559	29.8	11.6	11.2	12.0	1.9*
Cerebrovascular disease (I60–I69)	633	7.9	3.7	3.3	4.0	1.6*	651	9.0	3.4	3.1	3.7	2.1*	1,284	8.4	3.6	3.3	3.8	1.9*
Stroke (I60–I64)	*572*	*7.1*	*3.4*	*3.0*	*3.7*	*1.9**	*575*	*7.9*	*3.0*	*2.7*	*3.3*	*2.2**	*1,147*	*7.5*	*3.2*	*3.0*	*3.4*	*2.0**
Acute rheumatic fever and chronic rheumatic heart disease (I00–I09)	241	3.0	0.4	0.4	0.5	4.8*	445	6.1	0.9	0.8	1.1	8.6*	686	4.5	0.7	0.6	0.8	7.0*
Hypertension disease (I10–I15)	229	2.8	0.9	0.7	1.0	3.4*	359	4.9	1.5	1.3	1.7	4.0*	588	3.8	1.3	1.1	1.4	3.8*
Other diseases of the circulatory system (I70–I99)[(j)]	808	10.0	3.4	3.1	3.7	0.6*	791	10.9	3.0	2.7	3.2	0.6*	1,599	10.4	3.2	3.0	3.4	0.6*
Total	**8,041**	**100.0**	**38.3**	**37.2**	**39.4**	**1.5***	**7,273**	**100.0**	**32.8**	**31.9**	**33.7**	**2.0***	**15,314**	**100.0**	**35.4**	**34.7**	**36.1**	**1.7***

(continued)

Table 1.05.4 (continued: Hospitalisations of Indigenous persons for principal diagnosis of diseases of the circulatory system, by type of circulatory disease and sex, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006[(a)(b)(c)(d)]

* Represents results with statistically significant differences in the Indigenous/other comparisons at the $p < 0.05$ level.

(a) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.

(b) Categories are based on the ICD-10-AM fifth edition (National Centre for Classification in Health 2006); ICD-10-AM codes I00–I99.

(c) Financial year reporting.

(d) Data are reported by state/territory of usual residence of the patient hospitalised and are for New South Wales, Victoria, Western Australia, South Australia, the Northern Territory and Queensland only. These six jurisdictions are considered to have adequate Indigenous identification, although the level of accuracy varies by jurisdiction and hospital. Hospitalisation data for these six jurisdictions should not be assumed to represent the hospitalisation experience in the other jurisdictions.

(e) Proportion of male, female and total hospitalisations of Indigenous persons in the period 2004–05 to 2005–06.

(f) Directly age-standardised using the Australian 2001 standard population.

(g) LCL = lower confidence limit.

(h) UCL = upper confidence limit.

(i) Rate ratio Indigenous:other.

(j) Includes disease of arteries, arterioles and capillaries, diseases of veins, lymphatic vessels and lymph nodes and other unspecified disorders of the circulatory system.

Source: AIHW analysis of National Hospital Morbidity Database.

Hospitalisations by additional diagnosis

Table 1.05.6 presents hospitalisations for additional causes of diseases of the circulatory system for Aboriginal and Torres Strait Islander peoples in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined.

- For the 2-year period July 2004 to June 2006, hospitalisations of Indigenous Australians with a principal diagnosis of circulatory diseases were commonly reported with other diseases of the circulatory system (64%), the disease category 'contact with health services and factors influencing health status' which includes dialysis (61%), and endocrine, metabolic and nutritional disorders (50%).
- In particular, hospitalisations with a principal diagnosis of ischaemic heart disease, cerebrovascular disease and other heart disease were commonly reported with an additional diagnosis of endocrine, metabolic and nutritional disorders (62%, 52% and 51% respectively).
- Indigenous Australians who were hospitalised with a principal diagnosis of cerebrovascular disease, which includes stroke, had diseases of the nervous system commonly reported as an additional diagnosis of hospitalisation (59%).

Table 1.05.6: Hospitalisations of Indigenous persons for principal diagnosis of circulatory disease, by additional diagnoses of hospitalisation, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006[(a)(b)(c)(d)]

	Reported with a principal diagnosis of circulatory disease								
Additional diagnoses of hospitalisation	Ischaemic heart disease (I20–I25)	*Acute myocardial infarction (I21)*	Pulmonary heart disease/ Other heart disease (I26–I52)	Cerebro-vascular disease (I60–I69)	*Stroke (I60–I64)*	Acute rheumatic fever /chronic rheumatic heart disease (I00–I09)	Hypertensive disease (I10–115)	Other circulatory diseases (I70–I99)[(e)]	All circulatory diseases
	Per cent								
Diseases of the circulatory system (I00–I99)	77.8	80.4	65.0	67.7	68.7	43.0	17.2	30.6	64.3
Contact with health services & factors influencing health status (includes dialysis) (Z00–Z99)	70.6	73.7	58.9	59.5	58.4	41.7	45.2	46.0	61.3
Endocrine, nutritional & metabolic diseases (E00–E90)	61.6	63.4	50.6	52.3	53.7	15.9	29.6	23.6	50.3
Diseases of the genitourinary system (N00–N99)	16.3	19.3	23.5	19.6	19.8	8.5	16.5	12.9	18.0
Diseases of the respiratory system (J00–J99)	11.6	15.5	24.5	14.1	14.1	14.0	8.0	6.9	15.2
Symptoms, signs & abnormal clinical & laboratory findings (R00–R99)	7.6	10.1	15.0	41.7	42.7	10.5	22.1	10.1	13.6
Mental & behavioural disorders (F00–F99)	10.7	11.8	15.5	20.5	21.1	4.7	14.3	10.3	12.8
Diseases of the nervous system (G00–G99)	4.7	5.7	6.7	58.6	62.0	1.6	5.3	4.3	9.6
Diseases of the digestive system (K00–K93)	6.1	7.5	8.6	8.3	8.8	7.0	5.8	15.4	8.0
Certain infectious and parasitic diseases (A00–B99)	5.0	7.6	8.8	12.1	12.6	10.8	3.6	6.8	7.1

(continued)

Table 1.05.6 (continued): Hospitalisations of Indigenous persons for principal diagnosis of circulatory disease, by additional diagnoses of hospitalisation, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006[(a)(b)(c)(d)]

	Reported with a principal diagnosis of circulatory disease								
Additional diagnoses of hospitalisation	**Ischaemic heart disease (I20–I25)**	***Acute myocardial infarction (I21)***	**Other heart disease (I26–I52)**	**Cerebro-vascular disease (I60–I69)**	***Stroke (I60–I64)***	**Rheumatic heart disease (I00–I09)**	**Hypertensive disease (I10–115)**	**Other circulatory diseases (I70–I99)[(e)]**	**All circulatory diseases**
					Per cent				
Diseases of the blood and disorders involving immune mechanism (D50–D89)	5.7	7.8	8.2	5.8	5.9	9.6	2.7	5.9	6.5
Diseases of the eye and adnexa (H00–H59)	4.4	4.7	4.9	11.3	11.7	0.6	3.4	2.5	4.7
Injury & poisoning and other consequences of external causes (S00–T98)	3.9	4.9	3.9	5.7	5.6	5.0	2.0	5.6	4.2
Other[(f)]	6.3	8.0	11.3	13.3	12.6	9.8	8.8	12.9	9.3
Total number	**6,598**	**2,446**	**4,559**	**1,284**	**1,147**	**686**	**588**	**1,599**	**15,314**

(a) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.

(b) Categories are based on the ICD-10-AM fifth edition (National Centre for Classification in Health 2006); ICD-10-AM codes I00–I99.

(c) Financial year reporting.

(d) Indigenous data are reported by state/territory of usual residence of the patient hospitalised and are for New South Wales, Victoria, Western Australia, South Australia, the Northern Territory and Queensland only. These six jurisdictions are considered to have adequate Indigenous identification, although the level of accuracy varies by jurisdiction and hospital. Hospitalisation data for these six jurisdictions should not be assumed to represent the hospitalisation experience in the other jurisdictions.

(e) Includes diseases of arteries, arterioles and capillaries, diseases of veins, lymphatic vessels and lymph nodes and other unspecified disorders of the circulatory system.

(f) Includes: diseases of the musculoskeletal system and connective tissue; diseases of the skin and subcutaneous tissue; neoplasms; congenital malformations, deformations and chromosomal abnormalities; diseases of the ear and mastoid process; pregnancy, childbirth and the puerperium; and certain conditions originating in the perinatal period.

Note: Sum of components may exceed 100% as more than one additional diagnosis can be reported for each hospitalisation.

Source: AIHW analysis of National Hospital Morbidity Database.

Time series analysis

Time series data are presented for the four jurisdictions that have been assessed as having adequate identification of Indigenous hospitalisations for all years from 1998–99 to 2005–06—Queensland, Western Australia, South Australia and the Northern Territory. These four jurisdictions represent approximately 60% of the Indigenous Australian population. New South Wales and Victoria were identified as having adequate identification of Indigenous hospitalisations from 2004–05 onwards, therefore they were included as part of the current period analysis (2004–05 to 2005–06) but not as part of the time series analyses.

Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians for diseases of the circulatory system over the 7-year period 1998–99 to 2005–06 are presented in Table 1.05.7 and Figure 1.05.3.

- In Queensland, Western Australia, South Australia and the Northern Territory combined, there were significant increases in hospitalisation rates for circulatory diseases among Indigenous Australians during the period 1998–99 to 2005–06. The fitted trend implies an average yearly increase in the rate of 0.6 per 1,000 which is equivalent to an increase of 11% over the period. There was a significant increase in hospitalisation rates for Indigenous males and no significant change in hospitalisation rates for Indigenous females.
- There were significant declines in hospitalisation rates among other Australian males, and females during the same period, with an average yearly decrease in the rate of around 0.5 per 1,000 population. This is equivalent to a 14% decline over the period.
- There were significant increases in the hospitalisation rate ratios and rate differences between Indigenous and other Australians for circulatory diseases over the period 1998–99 to 2005–06. The fitted trend implies an average yearly increase of 0.1 in the rate ratio (29% increase over the period) and 1.0 per 1,000 in the rate difference between Indigenous and other Australians (58% increase) for the period 1998–99 to 2005–06. This reflects a relative and absolute increase in the gap between hospitalisation rates for Indigenous and other Australians for circulatory diseases.

Note that changes in the level of accuracy of Indigenous identification in hospital records will result in changes in the level of reported hospital separations for Indigenous Australians. Also, changes in access, hospital policies and practices all affect the level of hospitalisation over time. Caution should be used in interpreting changes over time as it is not possible to ascertain whether a change in reported hospitalisation is due to changes in the accuracy of Indigenous identification or real changes in the rates at which Indigenous people are hospitalised. An increase in hospitalisation rates may reflect increased use of admitted patient hospital services rather than a worsening of health.

Table 1.05.7: Age-standardised hospitalisation rates, rate ratios and rate differences from circulatory diseases, Qld, WA, SA and NT, 1998–99 to 2005–06[(a)]

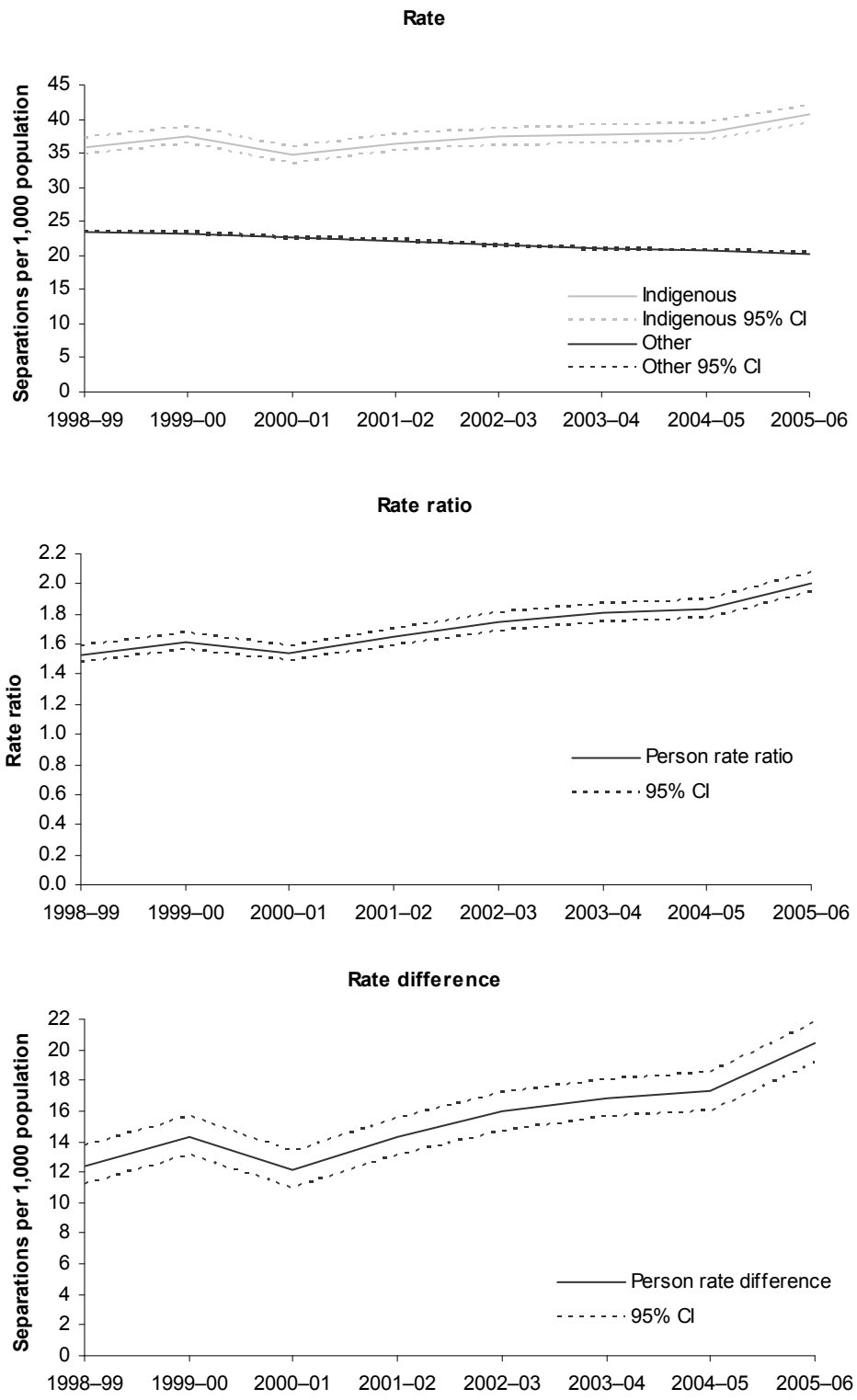
	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	Annual change[(b)]	% change over period[(c)]
Indigenous rate (separations per 1,000)										
Males	37.3	39.8	37.3	38.6	40.8	43.5	39.8	44.5	0.8*	15.9
Females	34.5	35.5	32.3	34.4	34.3	33.0	36.4	37.2	0.3	6.1
Persons	35.9	37.5	34.7	36.4	37.4	37.7	38.0	40.7	0.6*	10.8
Other Australian[(d)] rate (separations per 1,000)										
Males	28.9	28.6	27.6	27.0	26.3	25.7	25.3	24.9	–0.6*	–14.6
Females	18.6	18.4	18.0	17.7	17.0	16.6	16.6	16.0	–0.4*	–14.4
Persons	23.4	23.2	22.5	22.1	21.4	20.9	20.8	20.3	–0.5*	–14.2
Rate ratio[(e)]										
Males	1.3	1.4	1.4	1.4	1.5	1.7	1.6	1.8	0.1*	35.6
Females	1.9	1.9	1.8	1.9	2.0	2.0	2.2	2.3	0.1*	23.7
Persons	1.5	1.6	1.5	1.6	1.7	1.8	1.8	2.0	0.1*	28.8
Rate difference[(f)]										
Males	8.4	11.2	9.7	11.6	14.5	17.8	14.4	19.6	1.5*	121.2
Females	15.9	17.0	14.3	16.7	17.2	16.4	19.8	21.2	0.7*	30.2
Persons	12.4	14.3	12.1	14.3	15.9	16.8	17.3	20.4	1.0*	57.8

* Represents results with statistically significant increases or declines at the $p < 0.05$ level over the period 1998–99 to 2005–06.

(a) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.
(b) Average annual change in rates, rate ratios and rate differences determined using linear regression analysis.
(c) Per cent change between 1998–99 and 2005–06 based on the average annual change over the period.
(d) 'Other' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.
(e) Hospitalisation rates for Indigenous Australians divided by the hospitalisation rates for other Australians.
(f) Hospitalisation rates for Indigenous Australians minus the hospitalisation rates for other Australians.

Note: Rates have been directly age-standardised using the 2001 Australian standard population.

Source: AIHW analysis of National Hospital Morbidity Database.



Source: AIHW analysis of National Hospital Morbidity database.

Figure 1.05.3: Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians from circulatory diseases, Qld, WA, SA and NT, 1998–99 to 2005–06

Sensitivity of hospitalisation trends to changes in identification

- The fitted trends described above have been examined for their sensitivity to changes in Indigenous identification. Three scenarios for identification were posted—constant identification, increasing identification and decreasing identification:
  - Under the constant identification scenario, the number of hospitalisations for the period under study were adjusted using the following identification factors:
    - Queensland 87%
    - Western Australia 97%
    - South Australia 82%
    - Northern Territory 96%.
  - Under the increasing identification scenario, hospitalisations were adjusted by linearly increasing the identification through the period under study—from 82% in 1998–99 to 87% in 2005–06 for Queensland, from 95% to 97% for Western Australia, from 76% to 82% for South Australia, and from 94% to 96% for the Northern Territory.
  - Under the decreasing identification scenario, hospitalisations were adjusted by linearly decreasing the identification from 92% in 1998–99 to 87% in 2005–06 for Queensland, from 99% to 97% for Western Australia, from 88% to 82% for South Australia, and from 98% to 96% for the Northern Territory.
- The adjustments in the latter two scenarios were based on judgments about the largest plausible shifts in identification during the period; of course, if any actual shift in identification was more extreme than has been posted under these scenarios, then the observed trends in hospitalisations might not persist.
- The increase in hospitalisation rates for Indigenous males and the decrease in hospitalisation rates for other Australian males, females and persons overall over the period 1998–99 to 2005–06 remained significant under all three scenarios. The increases in hospitalisation rate for Indigenous persons remained significant only under the constant and decreasing identification scenarios.
- The increases in hospitalisation rate ratios for males and females remained significant under all three scenarios.
- The increases in the hospitalisation rate differences between Indigenous and other males and Indigenous and other persons overall remained significant under all three scenarios, whereas for females the increase in rate differences only remained significant under the constant and decreasing identification scenarios.

General practitioner encounters

Information about general practitioner (GP) encounters is available from the BEACH survey. Data for the 5-year period 2002–03 to 2006–07 are presented below. Circulatory problems are among the five most common types of problems managed at GP encounters with Indigenous patients.

- In the period 2002–03 to 2006–07 there were a total of 7,542 GP encounters with Aboriginal and Torres Strait Islander patients recorded in the survey, at which 11,219 problems were managed. Of these, 8.7% (979) were circulatory problems (Table 1.05.8).
- Circulatory problems were managed at a rate of around 13 per 100 encounters among Indigenous patients.
- After adjusting for differences in age distribution:
  - circulatory problems were managed at similar rates during GP encounters with Indigenous patients and other patients.
  - There were almost three times as many GP encounters for heart failure and twice as many GP encounters for ischaemic heart disease with Indigenous patients than with other patients over the 5-year period.

Table 1.05.8: Circulatory problems[(a)] managed by general practitioners, by Indigenous status of the patient, 2002–03 to 2006–07[(b)(c)(d)]

	Number		Per cent		Crude rate (no. per 100 encounters)						Age-standardised rate (no. per 100 encounters)[(e)]		
Problem managed	**Indigenous**	**Other[(f)]**	**Indigenous**	**Other[(f)]**	**Indigenous**	**95% LCL[(g)]**	**95% UCL[(h)]**	**Other**	**95% LCL[(g)]**	**95% UCL[(h)]**	**Indigenous**	**Other[(f)]**	**Ratio[(i)]**
Hypertension (K86, K87)	466	44,507	4.2	6.1	6.2	5.0	7.4	9.2	9.0	9.4	9.0	9.1	1.0
Ischaemic heart disease (K74, K76)	111	5,886	1.0	0.8	1.5	1.0	1.9	1.2	1.2	1.3	2.5	1.2	2.1
Heart failure (K77)	72	3,475	0.6	0.5	1.0	0.6	1.3	0.7	0.7	0.8	1.9	0.7	2.7
Cardiac check-up (K30, K31)	55	5,624	0.5	0.8	0.7	0.5	1.0	1.2	1.1	1.2	1.1	1.1	1.0
Atrial fibrillation/ flutter (K78)	31	4,035	0.3	0.6	0.4	0.2	0.6	0.8	0.8	0.9	0.8	0.8	0.9
Total circulatory problems(K00-K99)	***979***	***81,644***	***8.7***	***11.3***	***13.0***	***10.7***	***15.3***	***16.9***	***16.6***	***17.2***	***19.3***	***16.6***	***1.2***
Other problems managed	10,240	642,416	91.3	88.7	135.8	115.2	156.3	132.9	132.2	133.7	137.4	131.8	1.0
Total problems	**11,219**	**724,060**	**100.0**	**100.0**	**148.8**	**126.2**	**171.3**	**149.8**	**148.9**	**150.7**	**156.7**	**148.4**	**1.1**

(a) Classified according to ICPC-2 chapter codes (Classification Committee of the World Organization of Family Doctors (WICC) 1998).

(b) These survey results are likely to undercount the number of Indigenous Australians visiting doctors.

(c) Combined financial year data for 5 years.

(d) Data for Indigenous and other Australians have not been weighted.

(e) Directly age-standardised rate (no. per 100 encounters). Figures do not add to 100 as more than one problem can be managed at each encounter.

(f) 'Other' includes non-Indigenous patients and patients for whom Indigenous status was not stated.

(g) LCL = lower confidence interval.

(h) UCL = upper confidence interval.

(i) Rate ratio Indigenous:other.

Source: AIHW analysis of BEACH survey of general practice, AGPSCC.

Data quality issues

National Aboriginal and Torres Strait Islander Health Survey (NATSIHS)

The NATSIHS uses the standard Indigenous status question. The NATSIHS sample was specifically designed to select a representative sample of Aboriginal and Torres Strait Islander Australians and thus overcomes the problem inherent in most national surveys with small and unrepresentative Indigenous samples. As with other surveys, the NATSIHS is subject to sampling and non-sampling errors. Calculations of standard errors and significance testing help to identify the accuracy of the estimates and differences.

Information recorded in this survey is essentially 'as reported' by respondents. The ABS makes every effort to collect accurate information from respondents, particularly through careful questionnaire design, pre-testing of questionnaires, use of trained interviewers and assistance from Indigenous facilitators. Nevertheless, some responses may be affected by imperfect recall or individual interpretation of survey questions.

Non-Indigenous comparisons are available through the National Health Survey (NHS). The NHS was conducted in major cities and regional and remote areas, but very remote areas were excluded from the sample. Time series comparisons are available through the 1995 and 2001 National Health Survey.

In remote communities there were some modifications to the NATSIHS content in order to accommodate language and cultural appropriateness in traditional communities and help respondents understand the concepts. Some questions were excluded and some reworded. Also, paper forms were used in communities in remote areas and computer-assisted interview (CAI) instruments were used in non-remote areas. The CAI process included built-in edit checks and sequencing.

Further information on NATSIHS data quality issues can be found in the NATSIHS 2004–05 publication (ABS 2006).

Hospital separations data

Separations

The number and pattern of hospitalisations can be affected by differing admission practices among the jurisdictions and from year to year, and differing levels and patterns of service delivery.

Indigenous status question

Some jurisdictions have slightly different approaches to the collection and storage of the standard Indigenous status question and categories in their hospital collections. The 'not stated category is missing from several collections. It is recommended that the standard wording and categories be used in all jurisdictions (AIHW 2005).

Under-identification

The incompleteness of Indigenous identification means the number of hospital separations recorded as Indigenous is an underestimate of hospitalisations of Aboriginal and Torres Strait Islander peoples. For several years, Queensland, South Australia, Western Australia and the Northern Territory reported that Indigenous status in their hospital separations data was of acceptable quality (AIHW 2007). The AIHW, however, has recently completed an assessment of the level of Indigenous under-identification in hospital data in all states and territories. Results from this assessment indicate that New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory have adequate Indigenous identification (20% or less overall under-identification of Indigenous patients) in their hospital separations data (AIHW unpublished data).

(continued)

Data quality issues (continued)

It has therefore been recommended that reporting of Indigenous hospital separations be limited to aggregated information from New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory. The proportion of the Indigenous population covered by these six jurisdictions is 96%.

The following caveats have also been recommended for analysis of hospitalisation data from selected jurisdictions (ABS & AIHW 2005):

- *Interpretation of results should take into account the relative quality of the data from the jurisdictions included (currently a small degree of Indigenous under-identification in data from Western Australia and the Northern Territory and relatively marked Indigenous under-identification in data from South Australia and Victoria).*
- *Data for these six jurisdictions over-represent Indigenous populations in less urbanised and more remote locations.*
- *Hospitalisation data for these six jurisdictions are not necessarily representative of the jurisdictions not included.*

Numerator and denominator

Rate and ratio calculations rely on good numerator and denominator data. The changes in the completeness of identification of Indigenous people in hospital records may take place at different rates from changes in the identification of Indigenous people in other administrative collections and population censuses. Denominators used here are sourced from Experimental estimates and projections: Aboriginal and Torres Strait Islander Australians 1991 to 2009 *(ABS 2004).*

From the AIHW study it was possible to produce correction factors for the level of Indigenous under-identification in hospital data for each jurisdiction and at the national level.

General practitioner data (BEACH)

Information about general practitioner encounters is available from the Bettering the Evaluation and Care of Health (BEACH) survey. The BEACH data on Indigenous Australians should be treated with care. First, the sample frame has not been designed to produce statistically significant results for population subgroups such as Indigenous Australians. Second, the identification of Indigenous Australians is not complete. In the BEACH survey, 'not stated' responses to the Indigenous identification question are often higher than the 'yes' responses. It can be assumed, therefore, that the survey consistently undercounts the number of Indigenous Australians visiting general practitioners, but the extent of this undercount is not measurable.

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